

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Allen A. Aradi Application No.: 10/696,618 Filed: 10/29/2003 Title: METHOD FOR REDUCING COMBUSTION CHAMBER DEPOSIT FLAKING <u>Attorney Docket No.: NM 7607</u>	Group Art Unit: 1714 Examiner: Cephia D. Toomer
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Commissioner of Patents
P.O. Box 1450
Alexandria, Virginia 22313

RESPONSE

Dear Sir:

Applicant submits this Response to the Office Action mailed February 27, 2007.

A request for one (1) month extension of time is enclosed herewith.

At present, all of the claims of the present application are rejected. Claims 1-8, 12-22 and 26-28 are rejected under 35 USC Section 103(a) as being unpatentable over Dorer in view of Kalghatgi. Claims 1-3, 6-10, 12-17, 20-24 and 26-28 are rejected under 35 USC Section 103(a) as being unpatentable over Henderson in view of Kalghatgi. Finally, claims 11 and 25 are rejected under 35 USC Section 103(a) as being unpatentable over Henderson and Kalghatgi, and further in view of Kaneko. For any one or more of the following reasons, Applicant respectfully submits that the rejections are traversed.

Applicant discusses herein the citation by the Examiner of the Kalghatgi reference. Specifically, the Examiner has relied upon the abstract of the Kalghatgi reference. Applicant is filing herewith the complete SAE Technical Paper that embodies the Kalghatgi reference—not just the abstract. Applicant believes that the explicit teachings of the Kalghatgi reference do not contribute to any finding of obviousness of the present invention. Instead, the Kalghatgi reference is an explicit support for the patentability of all of the claims of the present invention.

Applicant has also considered very carefully all of the arguments of the Examiner. Applicant continues to believe that the Office Action inadvertently attributes too much disclosure and teaching to the cited Dorer and Henderson references. As will be explained, Applicant submits that those references are not entitled to the broad teachings set forth in the Office Action.

Turning first to the Dorer reference, Applicant notes that the Office Action states that "Dorer teaches that the fuel additive of his invention reduces engine deposits (see column 1, line 50-55)." Applicant respectfully submits that this conclusion is not entirely correct. Applicant sets forth herein an excerpt from Dorer that includes the specific passage cited in the Office Action as referenced above.

Manganese and copper compounds are both effective in reducing the ignition temperature of diesel engine exhaust particulate. Copper compounds, however, are more effective ignition temperature reducers than manganese compounds. While copper compounds are very effective ignition temperature improvers, their use can result in engine deposits. In accordance with the present invention, it has now been found that the ignition temperature reduction and propagation of the burning of exhaust particulate from internal combustion engines, particularly diesel engines, is improved along with a reduction in engine deposits. (Column 1, Lines 43-55).

The above-referenced passage is relied upon by the Examiner as teaching that the Dorer composition actually reduces engine deposits. Instead, more correctly read, Dorer states that while copper compounds alone are better combustion improvers, the use of copper compounds can result in engine deposits. Therefore, according to Dorer, it is possible to obtain the beneficial results of a combustion improver by using less copper but combining the copper with manganese. The result of using less copper is that less engine deposits are formed. In other words, there is no reduction in engine deposits as a result of the Dorer composition, and there is no expectation, teaching, suggestion or motivation of the presently-claimed invention. Instead, less deposit is actually formed, because less copper compound is used. The Office Action says that the metal compounds of Dorer function as "detergents" to reduce deposits, however, Applicant submits that any person of skill in the art recognizes that a "detergent" in the context of fuel additives means a composition that actually decreases an amount of existing deposits. Therefore, a detergent not only prevents the formation of deposits, it reduces the amount of existing deposits. This definition of detergent is contrary to the above-referenced passage in Dorer that merely stands for the proposition that fewer deposits are formed (due to decreasing us of copper)--not that any deposits are actually removed by a detergent.

Applicant submits that the Henderson reference contains a teaching similar to that of Dorer. The Office Action requires as a basis for its rejection that Henderson suggests that it is an object of the Henderson invention to prevent combustion chamber deposits. This is an incorrect restatement of the disclosure of Henderson. Specifically, the passage cited by the Office Action reads as follows:

It is a further object of the invention to increase the detonation resistance of gasolines containing such additives without increasing either the toxicity of the fuel compositions or its tendency to lay down combustion chamber deposits. (Henderson, Column 2, Lines 15-19).

In other words, the proper statement of the disclosure of Henderson is that the gasolines disclosed in Henderson do not reduce combustion chamber deposits. In fact, Henderson merely states that the Henderson invention does not increase the tendency to lay down combustion chamber deposits. This means that combustion chamber deposits will still be formed. There is simply no increase in the tendency to lay them down. Henderson does not stand for any reduction or elimination of the formation of combustion chamber deposits.

In view of the foregoing, Applicant submits that neither Dorer nor Henderson stand for the proposition that their additives disclosed therein actually reduce combustion chamber deposits. Without this fundamental basis necessary for the respective Office Action rejections, Applicant believes that all of the rejections are traversed.

Finally, and alternatively, Applicant turns to the complete disclosure of the Kalghatgi reference. Applicant believes that the abstract referred to in the Office Action does not give a complete description of the disclosure of that reference. All of the rejections of the Office Action require that Kalghatgi stands for the proposition that conventional detergent additive packages make combustion chamber deposits less likely to flake. Without this essential assumption, the rejections of the present claims in view of the combination of Kalghatgi with either Dorer or Henderson are traversed.

Applicant believes that the complete teaching of Kalghatgi demonstrates the nonobviousness of the present invention and is a corroborating summary of the

testimony of Allen Aradi in his early-submitted declaration. Applicant calls the Examiner's attention to the "Conclusions" of Kalghatgi set forth at the end of the SAE Paper. Applicant submits that conclusions number 2, 3 and 5 are all relevant to teaching away from the present invention. Accordingly, Kalghatgi in fact stands for the fact that the present invention is unexpected and inappropriate for combination with either Dorer or Henderson as articulated in the Office Action. Each relevant Kalghatgi conclusion will be discussed separately.

Conclusion Number 2: There is a wide variation between different fuels and additives. Conventional detergent additive packages suppress flaking whereas some experimental additives can promote flaking.

As explained in the article, the "conventional" detergent packages used in Kalghatgi are set forth in Table 2 of Kalghatgi. These conventional packages include a polyether detergent- -AD 6. The other, experimental additive compositions include a polyether detergent (AD 3) as well as additive packages that include polyether amides (AD 7 - AD 10). Therefore, the conclusion number 2 of Kalghatgi is not that every detergent is inherently able to suppress combustion chamber deposit flaking. On the contrary, Kalghatgi only stands for the proposition that five (5) of the detergent additives that were tested suppress flaking while other detergent additive packages may actually promote flaking. Therefore, it is improper to state that all detergents will suppress flaking. Kalghatgi clearly stands for the proposition that just the opposite is true.

Conclusion Number 3. Deposition flaking depends on the temperature regime under which the deposits are formed. Thus fuels which might produce deposits which do not flake in one engine (or operating regime) might produce deposits which flake in another engine (or operating regime) with a different thermal environment.

Applicant has represented and argued in its responses that different engine types, including specifically the claimed engine types having advance emissions control, may have different combustion chamber flaking problems from other engine types. The conclusion of Kalghatgi explicitly reinforces and scientifically endorses this view that not all engines operate the same. Not all combustion chamber deposits flake the same. In fact, these deposits will flake in different ways in different thermal environments which includes different types of engines.

Conclusion 5. There is no correlation between the deposit level i.e. weight or thickness and the susceptibility to flake.

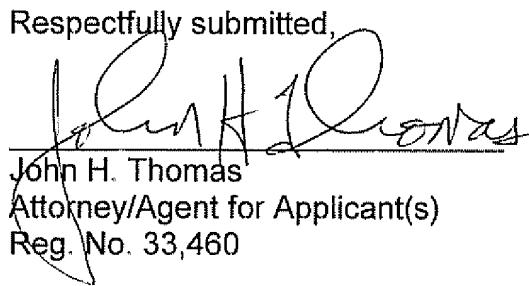
This statement regarding the fact that combustion chamber deposit flaking is not necessarily directly correlated with the amount of deposits is a direct endorsement of Applicant's earlier arguments. In other words, the present invention is not directed to the formation or lack thereof of combustion chamber deposits. The present invention is directed to reducing flaking of those deposits. In the Office Action, there is the following statement: "Dorer and Henderson specifically teach that the metal compounds do inhibit deposits and the skill artisan having a spark-ignited combustion engine having an advanced emissions control would have every expectation that the composition of Henderson and Dorer would reduce deposit flaking in the combustion chamber, *especially in view of the teachings of Kalghatgi.*" (Page 7 of Office Action, emphasis added.) Applicant submits that this statement of the Office Action is explicitly refuted by the foregoing conclusion of Kalghatgi.

With the foregoing fundamental clarifications of the disclosure of the prior art references cited in the Office Action, Applicant repeats and realleges all of its earlier arguments and contentions. Dorer and Henderson do not disclose or teach any

reduction in engine deposits. There is no disclosure of flaking. There is no teaching that correlates engine deposits with flaking other than the affirmative statement of Kalghatgi that there is no correlation between combustion chamber deposits and flaking. For any one or more of the reasons explained herein, Applicant submits that all of the rejections are traversed. Favorable action is requested hereon.

It is believed that there are no additional fees associated with this filing. However, in the event that this is incorrect, the Commissioner is hereby authorized to charge any deficiencies in fees or credit any overpayment associated with this communication to Deposit Account No. 50-2127.

Respectfully submitted,


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